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CURRENT FINANCIAL STRESS:

SOURCES AND STRUCTURAL IMPLICATIONS FOR U.S. AGRICULTURE

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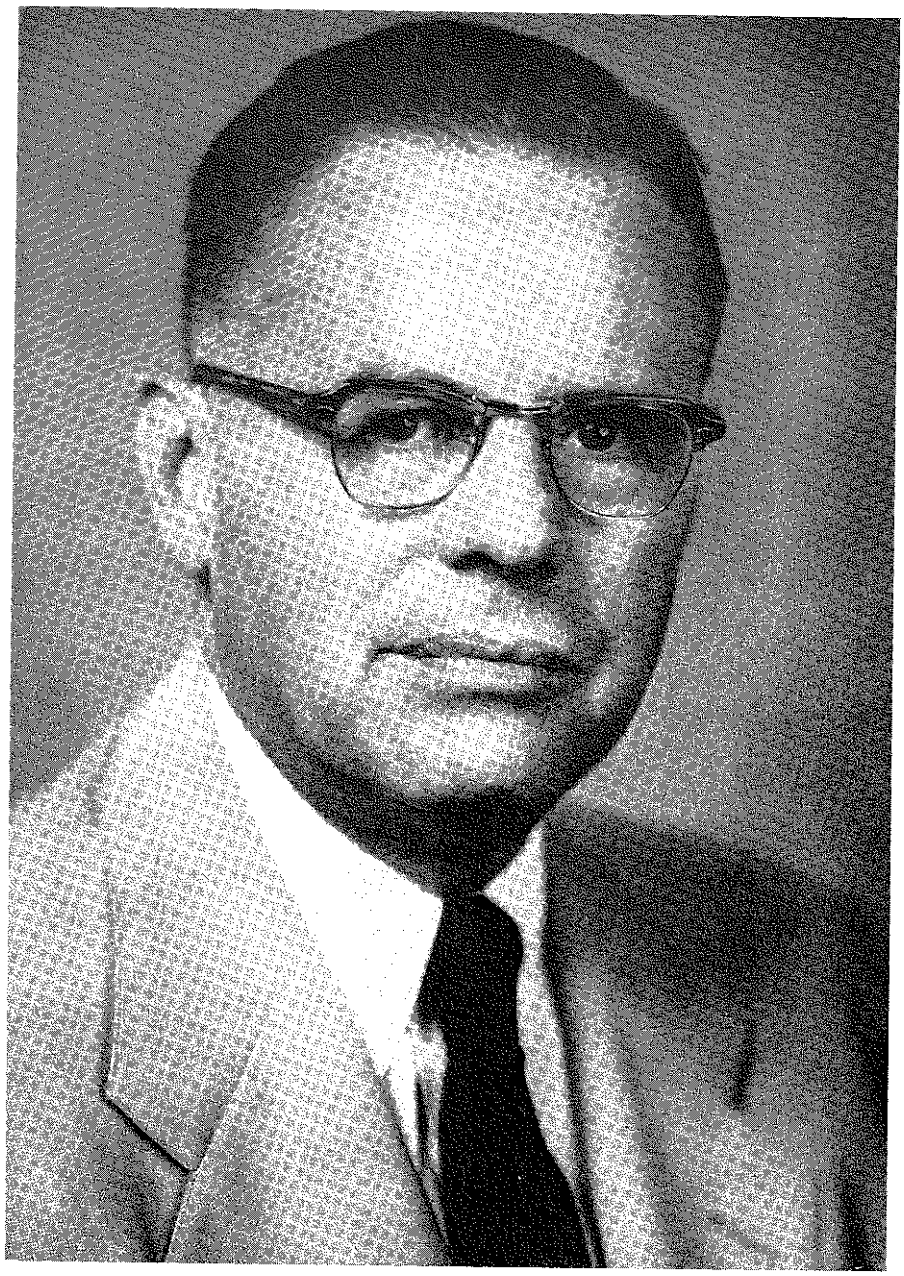

William I. Myers (1891-1976) was one of the early agricultural economists who worked on problems of agricultural finance. He was appointed a full professor of farm finance at Cornell University in 1920. In 1932, Professor Myers was asked to prepare recommendations for a legislative program to solve the agricultural finance problems of those times. His proposals found approval from President-elect Roosevelt, and his ideas formed the foundation for the creation of the Farm Credit Administration and the present Federal Cooperative Farm Credit System. Then, at the request of President Roosevelt, he was granted a leave of absence from Cornell in March 1933 to serve as assistant to Henry Morgenthau, then chairman of the Federal Farm Board. Morgenthau was appointed the first governor of FCA, and Myers became Deputy Governor. Then, when Morgenthau became Secretary of the Treasury in September 1933, Myers was appointed governor of the Farm Credit Administration. He served in that capacity until 1938 when he returned to Cornell University as head of the Department of Agricultural Economics. In 1943, he became Dean of the College of Agriculture serving until 1959.

The purpose of the W. I. Myers Memorial Lecture is to bring to this campus an outstanding agricultural finance economist to lecture on a timely topic. The lecture is sponsored by the Cornell University Department of Agricultural Economics as a part of its continuing emphasis in agricultural finance.

CURRENT FINANCIAL STRESS: SOURCES AND STRUCTURAL IMPLICATIONS FOR U.S. AGRICULTURE[1]

C. B. Baker[2]

By 1980, only six years ago, U.S. farmers appeared poised for a new golden age. They had just experienced a decade of global expansion in demand for farm commodities, an expansion in which they had enjoyed the lion's share. They had digested sixty years of rapid technological change. The digesting process had not been easy. A third of U.S. farms had disappeared in the 1950's and again in the 1960's. But it appeared by 1980 that there would be a demand for U.S. farm output that equated with supply at prices that would support prosperity for the remaining U.S. farms, perhaps even at levels of non-farm sectors.

Riding the crest of the new era were the aggressive "young tigers" who were seizing opportunities generated by the commodities boom of the 1970's. They were financed by a financial community swollen with liquidity for reasons outlined below. Many of the young tigers and their lenders now are the victims of failed expectations. How could they have been so wrong? Or, given such sharp and recent reversals, how can we be so sure that we are right in the gloomy predictions now in vogue and so widely accepted?

In my paper I will argue that the failure of expectations has arisen from ignoring the agricultural consequences of economic development and the internationalization of agriculture and its

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financial community, as well as the widely recognized abrupt changes in macro economic management. We then will look at some of the possible structural issues significant for U.S. agriculture and rural financial markets.

Agriculture in Economic Development

Perhaps nowhere in the world is the record of how agriculture affects, and is affected by economic development more clearly revealed than in the U.S. The key is in resources made surplus by increasing agricultural productivity. In market-led economic development, agriculture is told by chronically declining terms of trade that the process requires a continuing diminution in the share of the nation's resources allocated to agriculture. This is what is revealed in the data of Figure 1. Since 1930, farm income as a percentage of national income has declined, on average, by 16 basis points per year.

Half the explanation lies in the consequences of Engel's Law, one of the few empirically reliable laws of economics. Engel's Law says that as income increases the proportion spent for food commodities decreases. Secular increases of income produce a continuing decline in the income elasticity of demand for food commodities. Income elasticities of demand for food commodities are near zero in the U.S. and other more developed countries while still high in less developed countries with low incomes.

The other half of the explanation lies in the secular increase in agricultural productivity. The innovations recounted in the opening paragraph have positively shifted commodity supply curves across demand curves with price elasticities generally far less than unity. The result has been high premiums for early technological innovators and

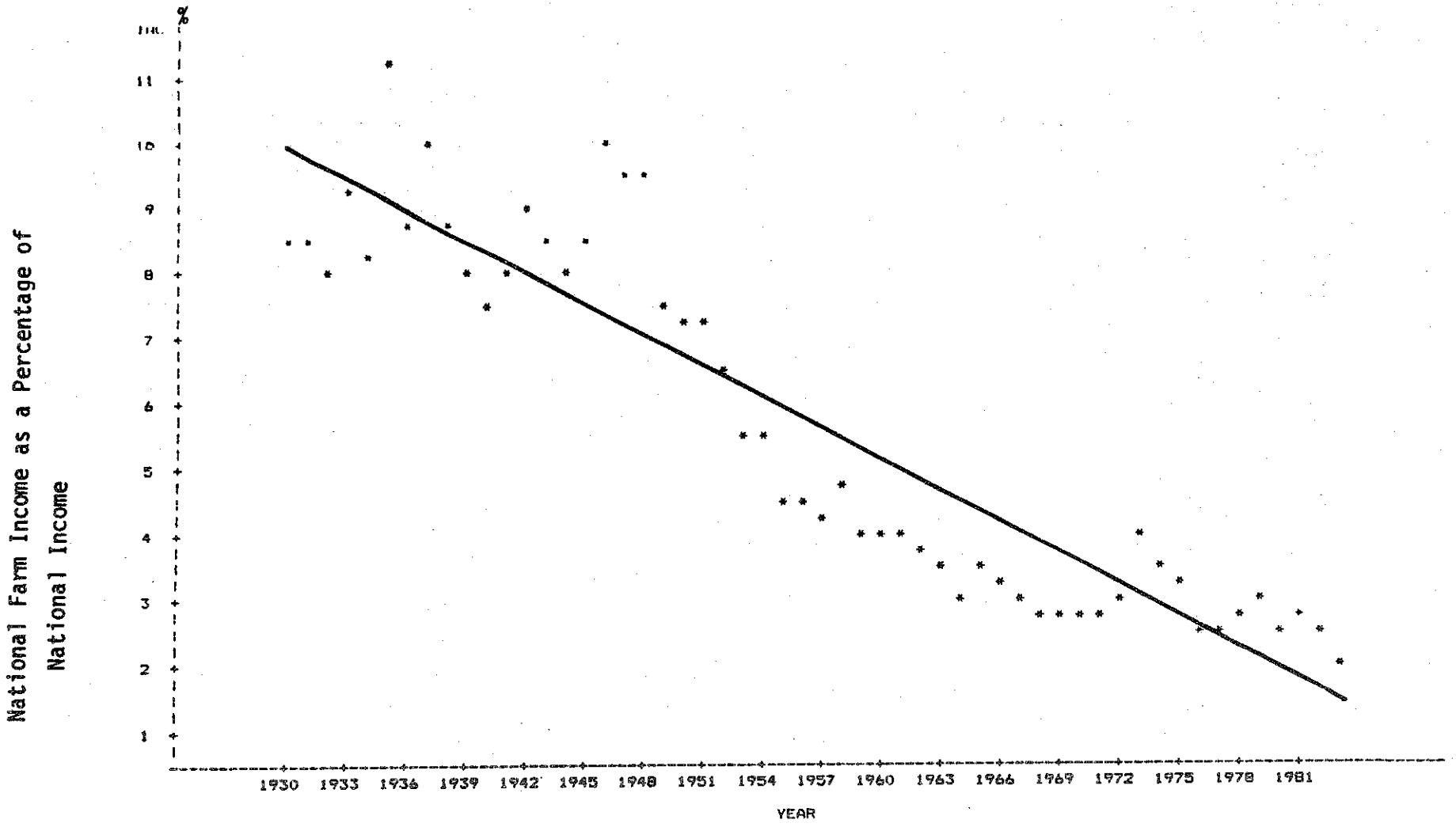

FIGURE 1. Secular decline in the share of national income to the U.S. farm sector.

Adapted from ERS, Economic Indicators of the Farm Sector: Income and Balance Sheet Statistics, 1983, EC IFS 3-3, U.S.D.A., September 1984. Trend = 9.77 - 0.16 t; t = 1930 - 1983.

severe penalties for those who lag, or who fail to leave agriculture in response to more favorable conditions elsewhere.

Chronic deterioration in agriculture's terms of trade does not mean unrelieved depression in agriculture. Figure 1 reveals episodic positive variations, about the declining trend. There is both logic and evidence to suggest that these favorable episodes create expectations all too readily capitalized into land values, implying a permanence in expectations that are difficult to justify in view of the chronic decline in agriculture's terms of trade.

There is little in these propositions that is not found in T. W. Schultz' Agriculture in an Unstable Economy, published in 1945, and further elaborated by E. O. Heady, in Agricultural Policy Under Economic Development, published in 1962. Subsequent observations simply support the early insights they provided. What is new, especially in the past two decades, is the internationalization of the propositions, owing to the spread of agricultural technology, the consequent spread of economic development, and the conversion of closed economies into open economies.(12)

International Aspects of U.S. Agriculture

The U.S. food and fiber system now accounts for about one dollar in five spent in the U.S. The farm component is only 13% of the system. It now is thoroughly internationalized. Farmers buy from farm suppliers who sell into export markets as well as to farmers. Farmers share a U.S. domestic commodity market with foreign producers. As U.S. farmers sell into export markets they compete with local producers there and with producers of other exporting countries.

International trade is managed by a complex of state and parastatal agencies as well as multinational firms.

The U.S. food and fiber system, farms included, are financed through financial markets now largely deregulated and highly integrated on an international as well as a domestic basis. U.S. farmers pay interest rates influenced by capital intensive economic development in Asia and elsewhere, as well as in urban U.S.A. Our own tight monetary and loose fiscal policies have revealed consequences that spill readily over national boundaries, affecting interest rates everywhere, and the exchange values of the U.S. dollar. Debt service burdens Third World countries influencing their demand for U.S. exports and threatening the solvency of international lenders. We have one-world commodity and financial markets. They transmit shocks that heavily influence the U.S. food and fiber system and the economic welfare of firms and families throughout the system.

A still smaller part of the food and fiber system is represented by research and development (R&D). Yet agricultural R&D, U.S. and elsewhere, has a tremendous impact on economic development. The impact is on the demand side as well as the supply side for agricultural commodities. Economic development requires an economic surplus that can be tapped for investments to generate economic growth. In much of the developing world, as in 19th century U.S., agriculture is the likely source in which the surplus can be produced. Agricultural R&D is the triggering mechanism. An economic surplus in agriculture is a necessary condition for economic development in countries still largely rural. The sufficient condition is using the surplus in developmentally sensible ways. Demand for food commodities will

follow. If comparative advantages are consistent with economic development outside agriculture, the demand will be for food imports.

The U.S. in World Agricultural Trade

The position of U.S. agriculture in the value of world traded farm products is suggested in Figure 2. The world recession of the early 1980's is reflected in the decline in the value of world agricultural exports through 1983. The U.S. share declined as well early in this period. Failure of the U.S. to participate more in the 1984 upturn in value of world agricultural exports portended the sharp decline in 1985 in the value and share of U.S. agricultural exports: to about $29 billion for U.S. agricultural exports, compared with nearly $38 billion for U.S. agricultural exports, in 1984.

The adversity of foreign demand for major U.S. agricultural exports is reflected in the massive declines in their export value: a reduction of more than one-third in the export value of food and feed grains plus oilseeds. They are devastating to U.S. agriculture because of the importance of these crops in the total of U.S. agricultural exports. The decline in value of exports for livestock and livestock products is less dramatic. But such exports have been small in relation to the total. Rebuilding demand for exports will involve contributing to an increase in the size of agricultural export markets as well as increasing U.S. participation in those markets.

Financial Aspects of Agricultural Trade

Trade is traditionally explained by specialization arising from differences among trading units in the opportunity costs of traded products. If A and B both can produce corn and wheat, but by producing

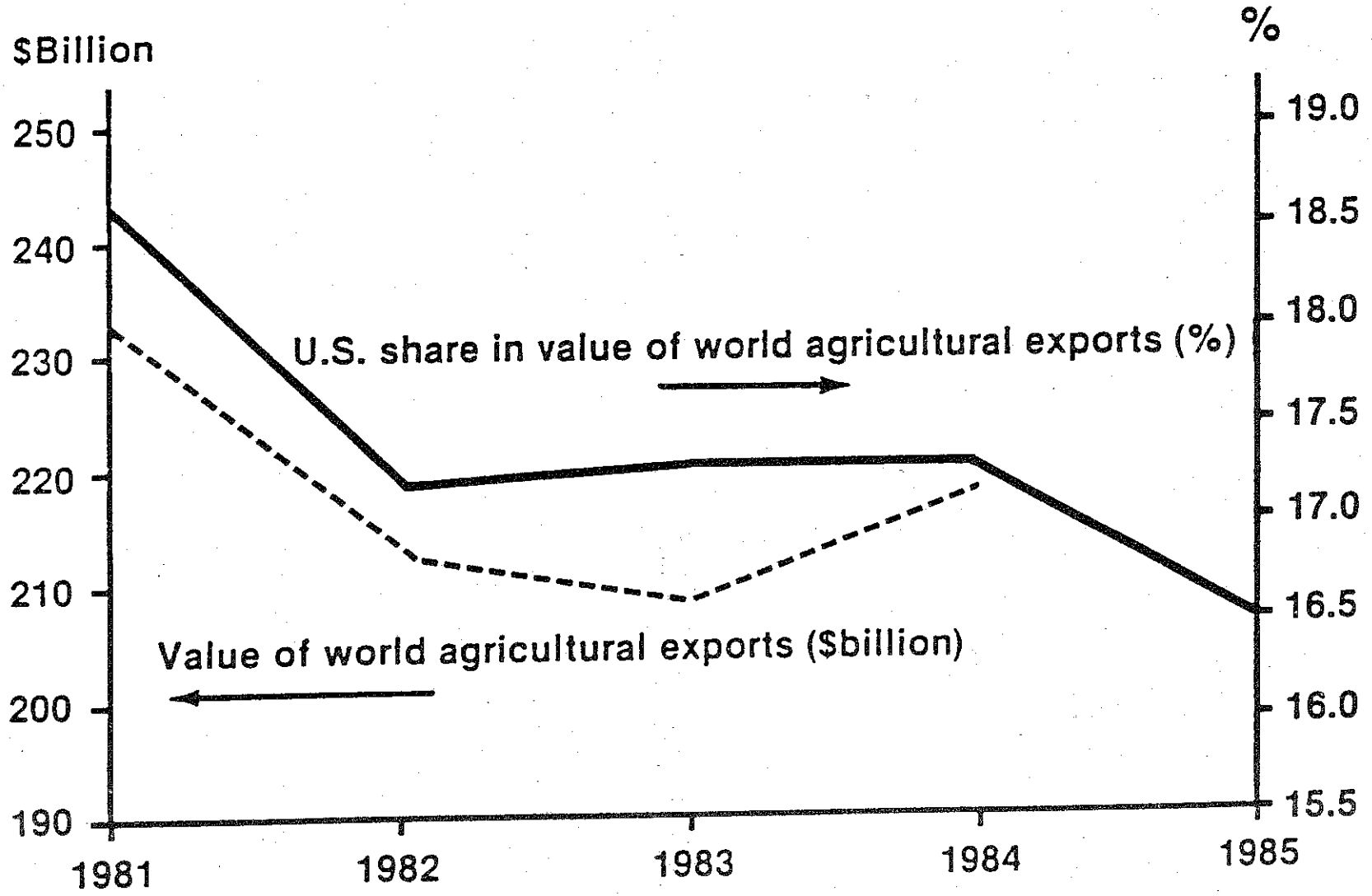

FIGURE 2. Value of Agricultural Exports: World ($billion) U.S. Share of World (%): 1981-1984

corn instead of wheat A gives up less wheat than B, A will produce corn and B will produce wheat. The trading units may be persons, regions or sectors distributed within or between countries. The Law of Comparative Advantage concludes that products will be produced where opportunity costs are least. It is an economic law with a substantial basis in actual data, especially within countries that are market oriented. Many technologies new in recent decades have reduced comparative advantages based on land resources, only to create other bases for comparative advantage.

Between countries the effects of the Law of Comparative Advantage are modified by political differences.[3] Such differences are expressed in tariffs and subsidies, in non-tariff trade barriers, and in transportation and credit interventions. Countries also differ in macroeconomic management and thus in level and stability of incomes, price levels, interest rates and, notably, exchange rates, values of own currencies in terms of the currencies of importing countries and of export-competitor countries.

Exchange rates were fixed at the end of World War II in the Bretton Woods Agreement, produced to avert the chaos that characterized world trade between World Wars I and II. The Agreement was abandoned in the early 1970's under pressures channeled through international financial markets, grown large and increasingly integrated over the previous two decades. These markets have since grown apace, influenced

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[3]Latin American have criticized the U.S. and other "center" countries for restraining adjustments implied by the Law of Comparative Advantage that would share gains from trade with "periphery" countries

by OPEC trade surpluses during the 1970s and the somewhat related increase in lending to less developed countries (LDCs) and centrally planned countries by lenders in more developed countries (MDCs) as they recycled "petrodollars" deposited with them by OPEC.

The current state of exchange rate arrangements are given in highly aggregative terms in Table 1. Fifteen of the world's currencies float independently: eight of LDCs and seven of MDCs. The seven of MDCs are the currencies in which the vast bulk of the world's trade and capital transactions are denominated. In addition, these are the currencies important in the pegging or other management of the rest of the currencies. For example, those identified as "managed floating" are defined in terms of currency "baskets" in which the major MDC currencies are prominent. Indeed the Special Drawing Right (SDR) of the International Monetary Fund (IMF) is itself based on a basket of currencies dominated by the currencies of MDCs identified as independently floating.

Exchange rates are important in trade between countries. A foreign importer must pay for U.S. exports with U.S. dollars. The price he pays for a U.S. commodity is determined not only by the dollar price of the commodity but also by the price of the dollars in terms of his own currency. If for the Japanese importer the price of U.S. dollars increases more than the price of Australian dollars, the cost to him of U.S. products will have increased more than the cost of Australian products unless there are compensating price changes for the products in the U.S. and/or Australia.

Table 1. Exchange Rate Arrangements, by Group of Countries, as of December 31, 1985.

More Developed Countries

7	with independently floating
4	with managed floating
2	with pegged

Less Developed Countries

8	with independently floating
17	with managed floating
31	with exchange rates pegged to the $U.S.
12	with exchange rates pegged to the SDR
14	with exchange rates pegged to the French Franc
35	with exchange rates otherwise pegged

Source: IMF, Exchange Rate Arrangements and Exchange Rate Restrictions, Annual Report 1986, page 8.

In the 1970's the price of U.S. dollars decreased in terms of currencies of both importers and competitors. The size of the international market in agricultural commodities grew. So did the U.S. share in the total. In 1974 one U.S. dollar was worth, for example, only $0.67 Australian. U.S. agriculture became the world's bargain basement for importers of food commodities.

In the early 1980's foreign demand for U.S. exports has slackened as the price of U.S. dollars increased in terms of the currencies of both importers and of competing exporters. In 1986 one U.S. dollar has been priced in Australian dollars at from $1.42 to $1.66. Since 1985 the exchange values of U.S. dollars have declined again in terms of the currencies of importers, though not in terms of currencies of most export competitors.

The exchange values of the U.S. dollar are not, of course, the only factors influencing the demand for U.S. exports. Perhaps the most important factor is income available in countries that import food commodities. The determinants here are per capita incomes in the importing countries and debt service obligations against that income.

Table 2 gives 1980 population and per capita income for LDCs and MDCs, and for categories of LDCs. Also shown are changes since 1980 in per capita incomes. Size of population and income changes are important factors in the demand for agricultural exports. Low income LDCs are dominant in population (2.1 billion in 1980) but limited in demand for world exports by their low incomes. High income LDCs are predominantly oil (or other extractive) exporters. While impressive in per capita incomes small populations (17 million in 1980) limit their direct influence on demand for world agricultural exports. On the

TABLE 2. POPULATION AND INCOME DATA: BY GROUPS OF COUNTRIES: 1980-1985

Group of countries	Population 1980 (million)	Income per cap. (1980: $U.S.)	Yearly change in income per capita (%)				
			1981	1982	1983	1984	1985[a]
LDCs	3,124	660	1.0	-0.7	0.0	3.3	2.4
Low income	2,102	260	3.0	3.2	6.1	7.4	6.1
Mid-income							
Oil importers	580	1,660	-0.8	2.0	-1.6	1.8	1.0
Oil exporters	441	1,250	1.5	-2.8	-4.4	0.7	0.0
High income	17	13,290	0.7	-7.6	-15.7	-3.0	-8.5
MDCs	716	10,530	1.1	-1.3	1.6	3.9	2.4

[a]Preliminary

Adapted from The World Bank, World Development Report, Oxford University Press, 1986, p. 154.

other hand the middle income LDCs have an aggregate population 43 percent larger than that of MDCs. They also have prospects for income-based growth in demand for agricultural exports.

Table 2 divides middle income LDCs between oil importers and oil exporters. Events that enriched the oil exporters in the 1970's restrained incomes among oil importers. Financing the higher cost oil imports contributed significantly to debt levels of oil importers and thus to current debt service obligations that limit their demand for agricultural exports. At present petroleum prices have moved (cycled?) downward, reversing the fortunes of oil exporters vs. oil importers, each group having adjusted expenditures to events of the 1970s.

Yearly increases since 1980 in per capita incomes of low income LDCs are impressive when compared with the rest of the world. The low income LDCs are dominated in terms of population by the South Asia Subcontinent. The Green Revolution has transformed India into an occasional wheat exporter, to the consternation of other wheat exporters. Yet as an indicator of future economic development such a transformation is highly favorable in the longer term for imports of food commodities. In the meanwhile continued aid is needed for this country group, with a heavy emphasis on getting food commodities to the impoverished, and in such fashion as to encourage rather than discourage economic development.

An outstanding and persistent issue is management of external debt owed by LDCs (and certain centrally planned countries). Net international lending grew apace from the mid-1970s through 1981: to finance costly oil imports, to finance development projects and later to finance debt service obligations. Much of the net lending was by

banks (hence at short maturities) and at variable interest rates: low in real terms through 1980 but then increasing in real terms through 1984.

Associated with increasing real interest rates, 1980-1984, was increasing exchange values of the U.S. dollar, the dominant currency in which the external debt is denominated. No wonder that Argentina, Brazil, Chile and Mexico, to name but a few troubled middle income LDC debtors, have been overwhelmed by debt service problems. Rebuilding demand for agricultural exports will depend in no small part on finding ways to restore their income after debt service and to increase the incomes of low-income LDCs. Recent innovations in Chile's debt management appear to have promising implications. (10) And the Green Revolution is beginning to produce long term economic growth.

A remedy basic to all other measures is to restrain excessive movements in the exchange values of the U.S. dollar with suitable macroeconomic policies. Critical to this remedy is restraint in the movements of U.S. real interest rates relative to real interest rates elsewhere. The task requires cooperation of others among MDCs as well as the U.S. It may not be possible to avoid significant restructuring, or even write-downs of external debt of some LDCs. It is essential to reduce the recurring burden of debt service so that economic development can be resumed. Along with those obvious measures is the need to maintain open markets for LDC exports. MDCs (U.S. included) prosper as LDCs prosper. Finally, it is essential that capital flows be reversed: toward rather than from LDCs. (16)

Remedies for low income LDCs are more elusive and more demanding in terms of time for results to materialize. The need continues for

multilateral and bilateral aid, aid that includes a significant agricultural component. Evidence now clearly shows that demand for agricultural exports is increased by agricultural aid to LDCs. The linkage explaining that result is in the economic development generated by the agricultural aid, including P. L. 480. Trade follows aid.

Structural Issues

Structural issues in the farm sector and among farm lenders are related because of ways in which the farm economy affects and is affected by financial markets and the structure of financial intermediaries that serve agriculture.[4]

In the Farm Sector

In a country so rich in regional diversity the wide prevalence and long persistence of the family-centered full-liability firm speaks highly of its adaptability in response to technological and market shocks of significant magnitude. It also reflects the institutional flexibility of a wide variety of leasing arrangements, partnership options and the alternatives made available with Chapter S incorporation.

The family-centered full-liability firm remains dominant among farm units whose annual sales are between $40,000 and $500,000. It is a source of problems in the inter-generation transfer of assets, but also a source of stable employment for a substantial though dwindling proportion of the nation's labor force. The expectation of capital gains from such units has effectively reduced opportunity costs required by equity holders that must be met by current incomes, thus supporting the supply of food commodities at low cost. Removing

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[4]This section relies heavily on (2) among References Cited.

preferential tax treatment of capital gains may increase those opportunity costs and thus prices of food commodities. Market structure assures rapid absorption of new technologies. In sum, the family-centered full-liability firm has proven to be a socially appealing form of farm organization.

At full equity (i.e. debt-free) the family-centered full-liability firm also is a formidable competitor in terms of risk survival. However this capability has been eroded by increased enterprise specialization and by an increase in the proportion of farm inputs purchased from non-farm sources. Since World War II, despite large increases of output, the index of total farm inputs has remained essentially unchanged. (9) However the index for non-purchased inputs dropped by about half while the index for purchased inputs about doubled. Because of less price flexibility for purchased vs. non-purchased inputs, risks from the farm supply side have increased. Combined with reduced enterprise diversification, the family-centered full liability firm is subject to substantially increased structural risk in production. This increase is offset somewhat for some units by such technological factors as irrigation and "over" mechanization.

In any event many family-centered full-liability farms now are subject to financial stress, the outcome of failed expectations represented in land and machinery purchases during the commodity boom of the 1970's, financed with borrowed funds. In 1984 Boehlje reported in his Myers Memorial Lecture that "financial stress is not unique to any particular size farm." Thus the 20% of farmers who owed 40% or more of the value of their assets also owned 20% of farm assets. However they owed 63% of farm debt. The eight percent of farmers who

owed 70% or more of the value of their assets owned eight percent of farm assets. But they owed 31% of farm debt. Thus while the incidence of debt was equally distributed among size groups, the amount of debt appears concentrated. There also is a concentration of debt in Middle-West and Great Plains agriculture, the direct effect of eroded demand for exports of corn, wheat and soybeans.

There also may be a difference between size groups in capacity to manage risk. Many units with sales of less than $40,000 generate chronically negative cash flows. However they provide other utilities to owners, many of whom have other important sources of income. The farm is but a part of the portfolio of its operator. Many farms with annual sales over $500,000 survive because of risk sharing on the basis of shared equity, in one form or another. Many of these also are farms organized with labor and management resources in excess of those furnished by the operator and his family. Thus it is that financial stress has focussed so sharply on family-centered full-liability farms that are highly levered.

The 1950's and 1960's were the growth decades in the farm sector. From 1951 through 1960 farms disappeared at an average rate of 3.5% per year; from 1961 through 1970, at 2.9% per year. In contrast annual disappearance in the 1940's averaged only 1.2%; in the 1970's, a mere one percent. Ironically, farm disappearance has grown again in the 1980's to near the rate of the 1960's though now in response to financial stress rather than to off-farm income opportunities.

Much of the growth in farm size in the 1950s and 1960s was accomplished by operators who added rented to owned land. Land value as a percent of farm asset value grew in those decades at the slow rate

of 0.55% points per year. (2) In the 1970s growth was accomplished by operators who added purchased to owned land, bidding up land prices in expectation of capital gains. The rate of farm disappearance was far less than in the 1960s. However from 1971 through 1981 land as percent of farm assets grew at the rate of 0.8% points per year (2). The farm sector was left with highly levered operators distributed among all size groups, and drained of liquidity. In 1950 deposits and currency plus U.S. savings bonds were more than 10% of total farm assets. By 1982 they had declined to less than 2%.

Financial stress in the farm sector has numerous structural effects: interregional and among farm types, owing to variations in export dependence, capital intensity and diversification in portfolios of income streams; and tenurial and business organization, owing to variations in risk-sharing advantages associated with equity sharing arrangements. Pervasive risk increases appear likely to increase everywhere the survival values of liquidity management.

None of these survival attributes seems necessarily related to farm size. Hence it is not clear that the prospect of a dual size-structure for the farm sector is all that imminent. It is true that the percentage of farms sales over $500,000 grew from 0.1 to 1.0 between 1969 and 1980. However the Consumer Price Index also nearly tripled in that period, and the percentage of farms in this size class has not increased appreciably since 1980. The percentage of farms with sales between $40,000 and $500,000 grew from 6.7 to 26.8 between 1969 and 1980, but by little since 1980. The percentage of farms with sales less than $40,000 declined from 93.2 to 72.2 between 1969 and 1983 and has continued to decline since. (8)

Among Farm Lenders

U.S. farmers are served by a four-part lending system. They share with the rest of the economy a highly diversified banking system presided over by a decentralized Federal Reserve System with obligations in money management that are formal domestically and implied internationally. The implied obligations arise from the international role of the U.S. dollar, as described above, and from regulatory obligations with respect to U.S. banks, those stressed by loans to foreign borrowers and those stressed by troubled domestic loans.

A second component consists of life insurance companies. Some companies make farm mortgage loans from reserves they hold to meet obligations to policy holders. Organizational structures vary widely among companies. As a group, life insurance companies tend to be selective as to areas of activity and cyclical with respect to farm mortgage lending intensity.

Since the Great Depression (and earlier for farm mortgage lending) farmers have been served by the Cooperative Farm Credit System, with its capacity to acquire funds from the sale of consolidated debt instruments that are the joint liability of all units and districts of the Farm Credit System. The System has long since retired the stock with which the federal government capitalized System units. However, under current stress it is likely that government resources remain available if needed, though conditions and terms of use are still none too certain.

The fourth component is the public sector, dominated by the federal government's Farmers Home Administration (FmHA) and the

Commodity Credit Corporation (CCC). The FmHA is a government-owned lender-of-last-resort, and an instrumentality used by the government to make emergency loans to finance recovery from identified disasters. The CCC makes non-recourse loans on commodities stored by farmers who participate in price and income programs. Thus the CCC loan program is addressed more to price and income policy than to agricultural finance policy.

As in the farm sector, so also among farm lenders, the current financial stress in agriculture carries the potential for change within as well as among each of the four parts of the farm lending system. Among banks, the incidence of stress from farm loans depends greatly on the structure of the banking system. A brief example will illustrate (14). In 1984 defaults plus non-performing farm loans as a percentage of year-end farm loans was 2.2% for U.S. banks as a whole. For California, it was 6.1%, by far the highest for any state. For Iowa it was 2.9%, Illinois, 1.9%. Among banks with past-due plus non performing loans that exceeded total capital in 1984, farm loans as a percent of total loans was 7% for the U.S. as a whole. In California it was a mere 1%, for Iowa, a whopping 44%, and for Illinois, and intermediate 11%. The differences in stress among banks lies in the diversified portfolios of California banks that are branched state-wide, as compared with the dominantly unit banks of Iowa and Illinois. The stress level among Illinois banks is less than in Iowa, owing to a more diversified portfolio of loans in the case of Illinois banks. (5)

The same problem exists in the Farm Credit System, though exponentially greater because of a nation-wide portfolio that is essentially specialized in agricultural loans: farm and farm-related

firms. Geographic diversity provides some relief. Formal provisions in the System's organization seem adequate to exploit the geographic and the loan type diversity that exists (4). However, resistance to inter-district and inter-unit risk pooling developed in the post-World War II growth decades, decades largely stress-free in terms of debt repayment and collateral problems.

All this has turned around since 1981, with profound and far reaching consequences for the informal rigidities and current litigations that have developed in the operation of the System. There clearly is need to reexamine the organizational structure of the System including all aspects of its capitalization, reserve requirements and liquidity management.

The greater the specialization of the lender to agriculture the greater is the need to develop risk response mechanisms. For both the banking system and the Farm Credit System, the most visible alternative is to diversify loan portfolios. For banks, branching or comparable structural change is a plausible remedy, though limited in rural areas, given current banking legacies. However, such a remedy could well further increase the volatility in the cost of capital to farmers, since it would reduce still further any structural insulation of farmers from competition with nonfarm borrowers in financial markets. So long as the Farm Credit System is restricted to agricultural lending,the principal relief in loan diversity is to further reduce impediments to inter-district and inter-unit risk sharing. Differences in risk premiums presumably would be reflected in much greater interest rate variation among units than now exist.

From these highly visible remedies there doubtless would follow incentives for increasing the provision of capital with equity instruments: an expansion of leasing in farm land and other forms of capital as well, and perhaps a decline in the dominance of the full liability firm. The result would preserve the flow of capital to agriculture and distribute risks to other equity holders as well as to farm operators. Such results seem highly likely and need not be socially undesirable. (6) Let me conclude with another partial remedy with great social appeal: to build liquidity in the farm and farm lending sectors to counter the accelerated risks that seem to be with us for the foreseeable future. (2)

A Partial Remedy

The proposal is a pool of liquidity between the borrower and lender, dedicated to debt service. Its appeal is related to the risk inherent in the financing transaction, tailored to local conditions, with little or no cost to participants, with gains to both borrower and lender, and at zero cost to the public sector. I refer to it as a Debt Service Reserve Fund (DSRF) plan.

The DSRF would be a fund dedicated to the management of debt service obligations, the size of the fund a multiple of the periodic debt service obligation assumed by the borrower in a debt contract. The size of the fund would vary with the amount of periodic payment, the type of farm financed, and the financial condition of the borrower. It would be related positively with risk among farm types and farmers.

The initial DSRF for a given loan would be established as a part of the loan disbursement, (3) and would require an increment added to the total loan approved. However, the net cost added for the borrower

would be dampened by a return on the DSRF at a rate of interest equal to what he pays on the farm mortgage loan. Hence the net added periodic cost actually turns out to be the amortization on the increment of principal that is added by the DSRF. It could be offset easily by lengthening the maturity of the loan contract.

The DSRF would constitute a liquidity buffer to protect the lender from repayment failures originating in periodic deficits in the borrower's net cash flow. It would protect the borrower inasmuch as it would provide an extra source of liquidity dedicated specifically to meeting debt service obligations.

If drawn down by the lender to supplement borrower amortization payments, the DSRF later would be replenished with payments by the borrower in periods of net cash flow "surpluses." The borrower would benefit from added credit, based on financial security, as well as from the direct protection from lender options that are activated by delinquency and default.

The operation of the DSRF is best seen with an example based on a simple version of the plan. (2)

Let Farmer F buy 300 acres for $1,500 per acre, subject to a farm mortgage loan at 60% of the purchase price: i (= annual interest rate) = 12%; m (=maturity of loan) = 30 years. Thus the purchase price is $450,000 and the farm mortgage loan, $270,000. The annual debt service A_1, is $33,519.[5]

Set the DSRF at $3(A_1)$: 3 x $33,557 = $101,1879. The loan including the DSRF then becomes $270,000 + $100,557 = $370,557. The

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[5]$270,000/Uniform Series Present value factor for i = 12% and maturity = 30 years.

disbursement is $270,000 to the borrower and $101,557 to DSRF, where it earns for the borrower, R (DSRF) = $12,067 (=$100,557 x .12). The debt service, A_2, based on a loan with the DSRF is $46,002.[6] Thus the net debt service, A, is:

$A = A_2 - R$ (DSRF) = $46,002 - $12,067 = $33,935. Assuming a net income before debt service equal to $50,000, Farmer F's net cash flow would be $50,000 - $33,935 = $16,065. In addition he would gain $1,535 in equity in Year 1 based on payment of the principal component of the debt service installment, assuming no change in the DSRF.

If, in Year 1, his net cash flow exceeded expectations, F would retain the excess, because the DSRF is at the prescribed level. If in Year 1, it were less than expectation, A would be reduced (by application of an index) in proportion to the shortfall, the lender drawing on the DSRF to offset the deficit. F would retain a net cash flow of $16,065.

For any year t, begun with a DSRF of less than $100,557 (= $3A_1$) F would be required to pay into the Fund in proportion to any excess of realized net cash flow over expected net cash flow, subject to a limit of the greater of (a) the amount of the excess or (b) $100,557 - $DSRF_{t-1}$. When the DSRF, plus undisbursed interest, is equal to the farm mortgage loan balance, it is applied to retire the loan.

The plan is subject to choice among many design specifications (8): the size of the DSRF, the manner in which it is initially established, the basis on which increments or decrements are called for, the calculation and management of returns on the DSRF, and its final disposition. The central theme that runs through any design,

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[6] $370,557/8.0552.

however, is that the size of the DSRF should be positively related to risk: the higher the risk inherent in the loan contract, the higher the DSRF. Some features of the DSRF plan have been introduced before. But to my knowledge, they have always been optional with the borrower and limited to applicants perceived to be at the upper end of the scale in terms of loan quality. In the envisaged plan, the DSRF would be applied in proportion to perceived risk and even might become a condition to loan approval in certain circumstances.

Simulations at the University of Illinois suggest some of the gains that might be achieved with a DSRF plan. (1) Data from FmHA borrowers were used to compare failure rates, amounts defaulted, growth rates and liquidity performance under conventional and DSRF repayment plans. The data were drawn from borrowers in 1978. The simulations varied by scenario in commodity and land prices, by initial liquidity of the borrower, and by DSRF specification. The most severe of the price scenarios was not as severe as has since materialized. However DSRF specifications also were limited to 2 x amortization and, more importantly, initial liquidity was specified at a relatively high level for FmHA borrowers.

The DSRF was found generally to reduce the probability of failure, to reduce the amount defaulted, increase growth rates and to increase balance sheet liquidity as measured by the ratio of current assets (exclusive of the debt reserve) to current liabilities. Under the most severe of the price scenarios tested a debt reserve set at twice the annual amortization was found most effective for all performance measures. Failure rates were reduced by 16 percent, default amounts by nearly $33,000. Growth rates and liquidity improved substantially.

A further contribution of the DSRF is capital with some attributes of risk capital for the lender. In the CFCS borrowers now are required to buy stock at a fixed percentage of amount borrowed. While formally "at risk" in practice it is not subject to impairment. In contrast, the DSRF, in amounts determined by interest rate and maturity, would provide a much larger sum in total (see Table 3), and dedicated to offset risks from loan loss.

Table 3. Capital provided by DSRF per $1,000 of loan at selected loan maturities and interest rates: DSRF at 3 x amortization.

At maturity of	Annual interest 10%	12%
20 years	352.38	401.64
30 years	318.24	372.44

The DSRF proposal is not purported to be a complete remedy for a stress event of the magnitude of the current one or that of 60 years ago. Yet it does provide support where most needed, liquidity dedicated to debt service. Such support is especially needed by the family-centered commercial farm, where liquidity is a highly valued attribute, and for farm lenders whose loan portfolios are likely to lack the stability that comes from diversification.

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